

# ATS Resident Boot Camp Live 2021: Bronchoscopy

Van K. Holden, MD, FCCP

Assistant Professor of Medicine

Program Director, PCCM Fellowship

University of Maryland School of  
Medicine

Darlene R. Nelson, MD, MHPE

Assistant Professor of Medicine

Program Director, PCCM, CCIM, and  
Pulmonary Disease Fellowships

Mayo Clinic

# Objectives

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Identify appropriate pre-procedural preparation for bronchoscopy.

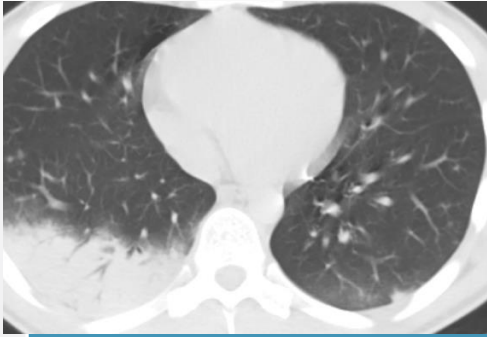


Describe a procedural approach to airway lesions.



Discuss management of bronchoscopy-related complications.

# Indications for Bronchoscopy



Infection



Hemoptysis



Persistent  
atelectasis

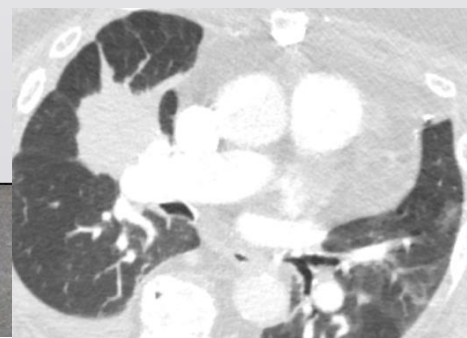
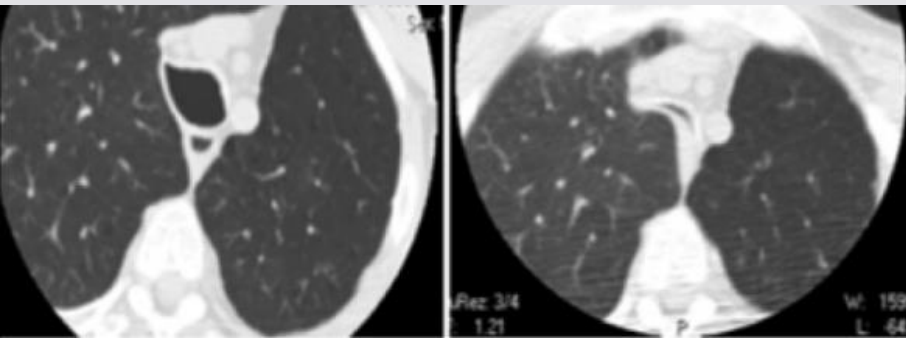


Lung transplant  
rejection

Tracheobroncho-  
malacia

Lung nodules /  
masses

Mediastinal  
lymphadenopathy



# Contraindications to Bronchoscopy

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Depends on the clinical situation



Most contraindications are relative rather than absolute



Absolute: uncooperative patient, operator inexperience, lack of adequate facilities and personnel to care for emergencies (arrest, pneumothorax, bleeding)

# Relative Contraindications

Current or recent MI, unstable angina, decompensated heart failure or arrhythmias

- General 6-week rule

Severe hypoxia, acute bronchospasm

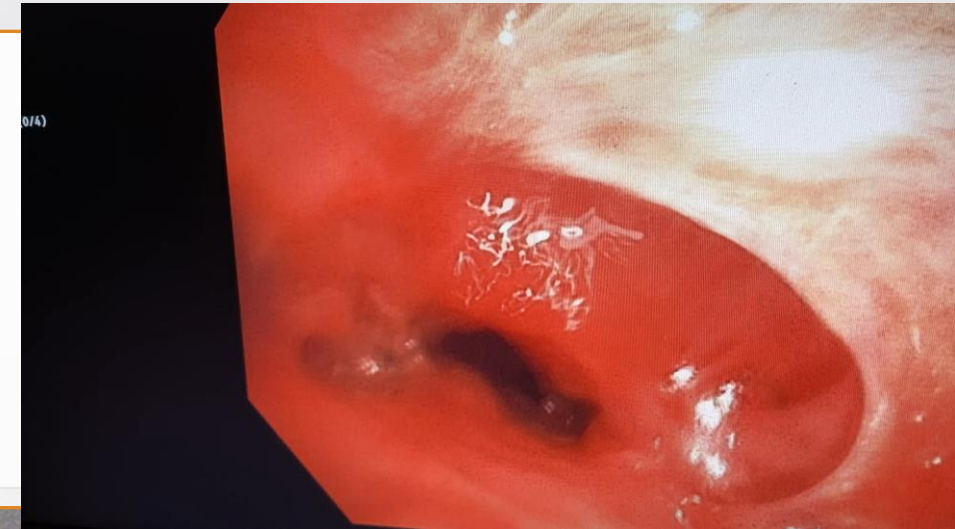
Stridor / advanced CAO

- Converting a relatively unstable airway into an unstable airway

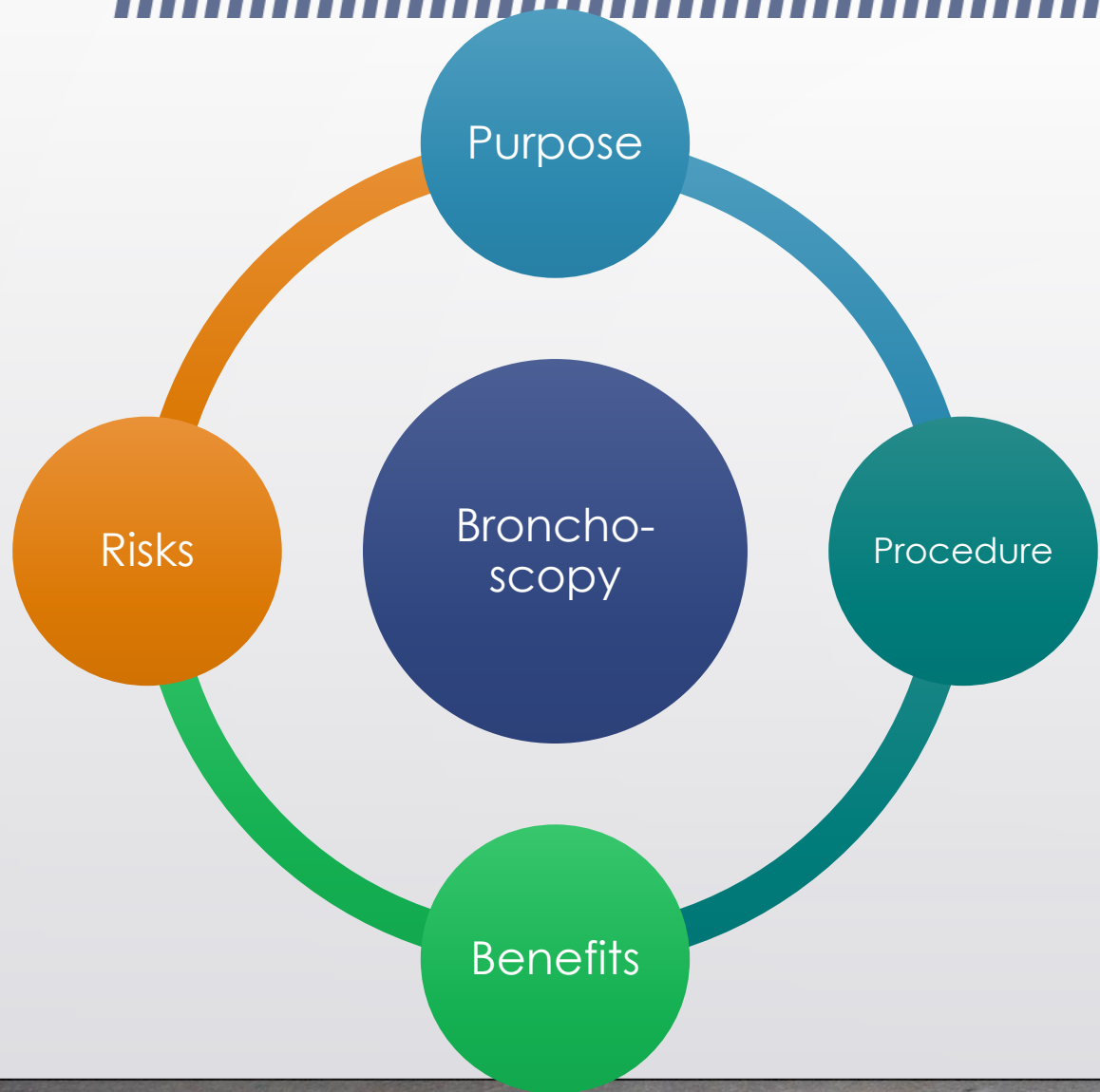
Coagulopathy

- Plavix within the past 5-7 days
- Warfarin within 5 days
- Platelets <50,000
- INR >1.6
- Severe uremia
- ASA is ok

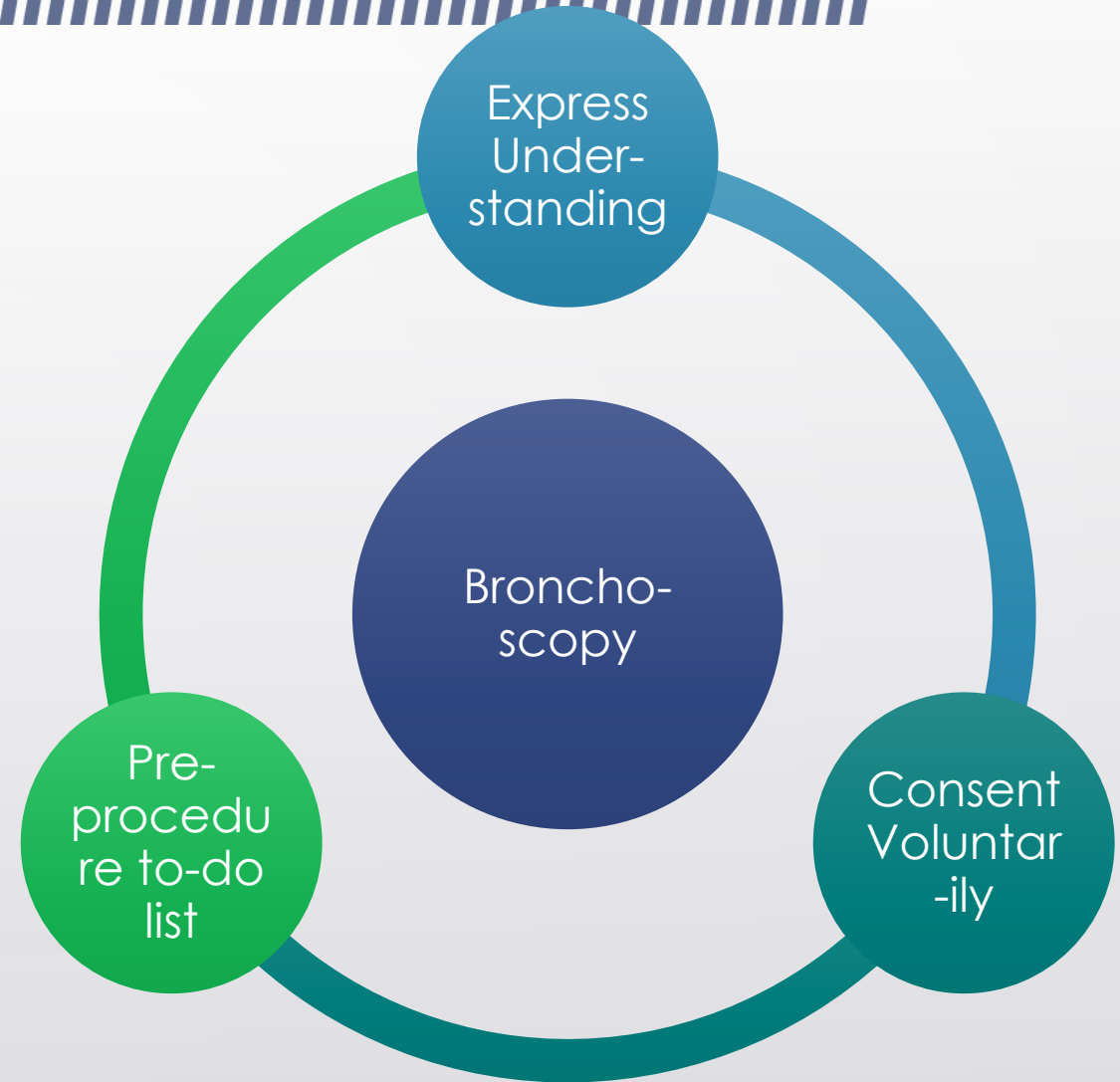
*Evaluate for these in your H&P!!*



# Obtaining Informed Consent



CLINICIAN'S RESPONSIBILITY

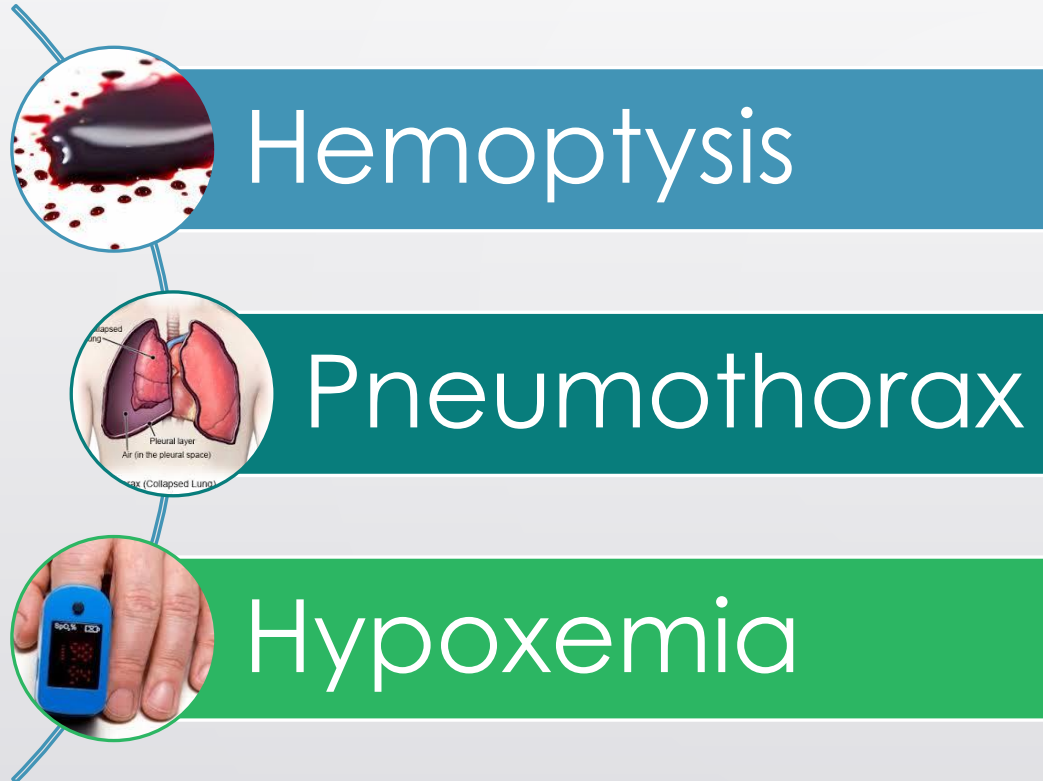


PATIENT'S RESPONSIBILITY

# Bronchoscopy-Related Complications




**Occur in <1% of cases**



You may do ~100  
bronchoscopies during  
your pulmonary  
fellowship  
=  
high likelihood of 1 or  
more of these occurring

# Pre-Procedure History and Physical Examination



History	Physical Examination
Smoking history	Vital Signs
Occupational exposure	Visual assessment
Comorbidities:	--Respiratory distress
--Asthma	--Stridor
--COPD	--Hoarseness
--Cardiovascular health	--Anatomic abnormalities of face and neck
--Bleeding disorders	--Spine deformities
--Liver disease	Lung auscultation
--Kidney disease	Cardiac auscultation
Allergies	
Medications	



# Pre-Procedure Testing & Instructions



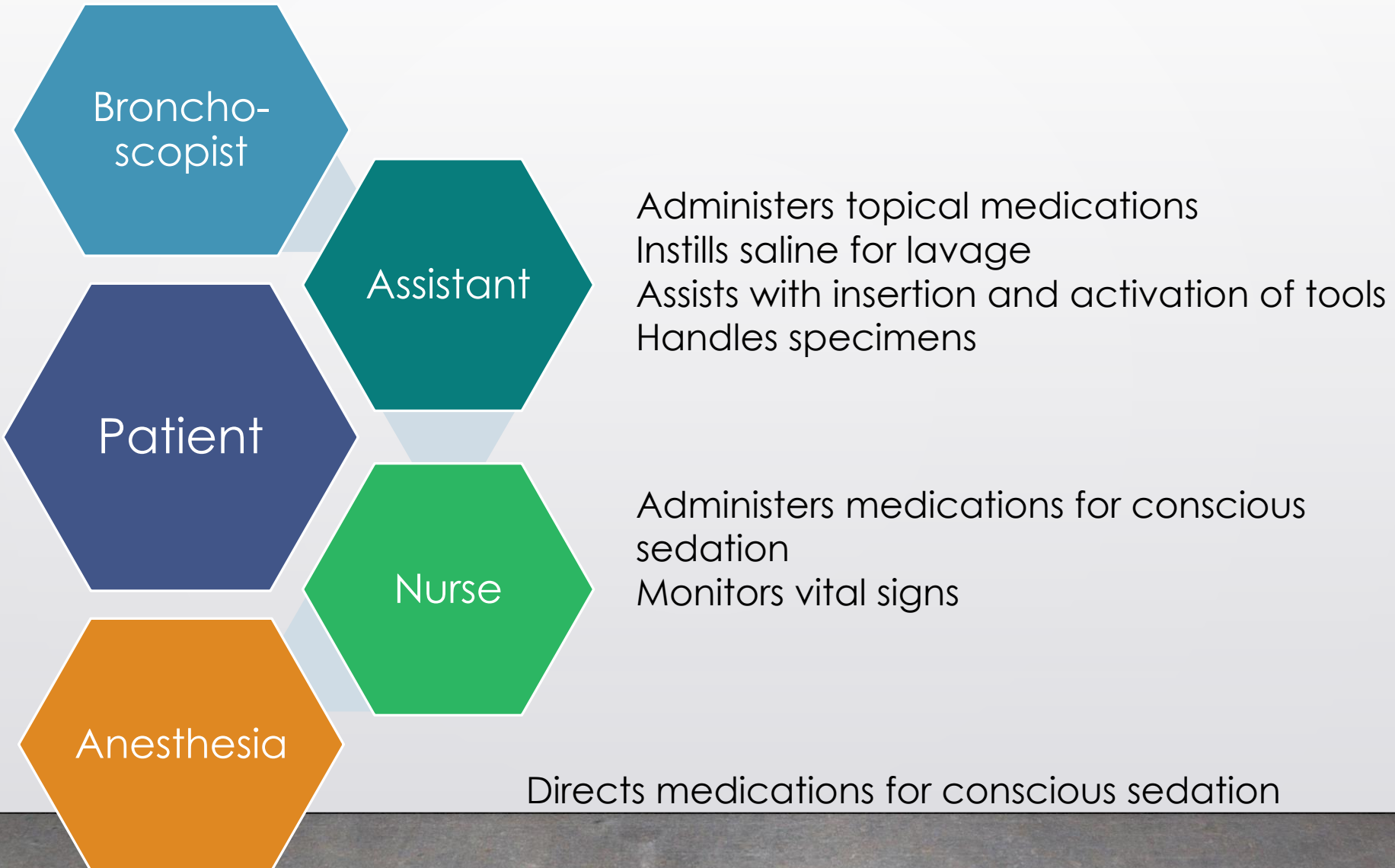
Testing	Review
Complete blood count	Chest X-ray
Basic metabolic panel	CT chest
Coagulation studies	Pulmonary Function Tests
EKG	Echocardiogram
<b>COVID-19 testing</b>	Prior amount of sedation required for procedures

- ✓ Instructions for NPO
- ✓ Ride home

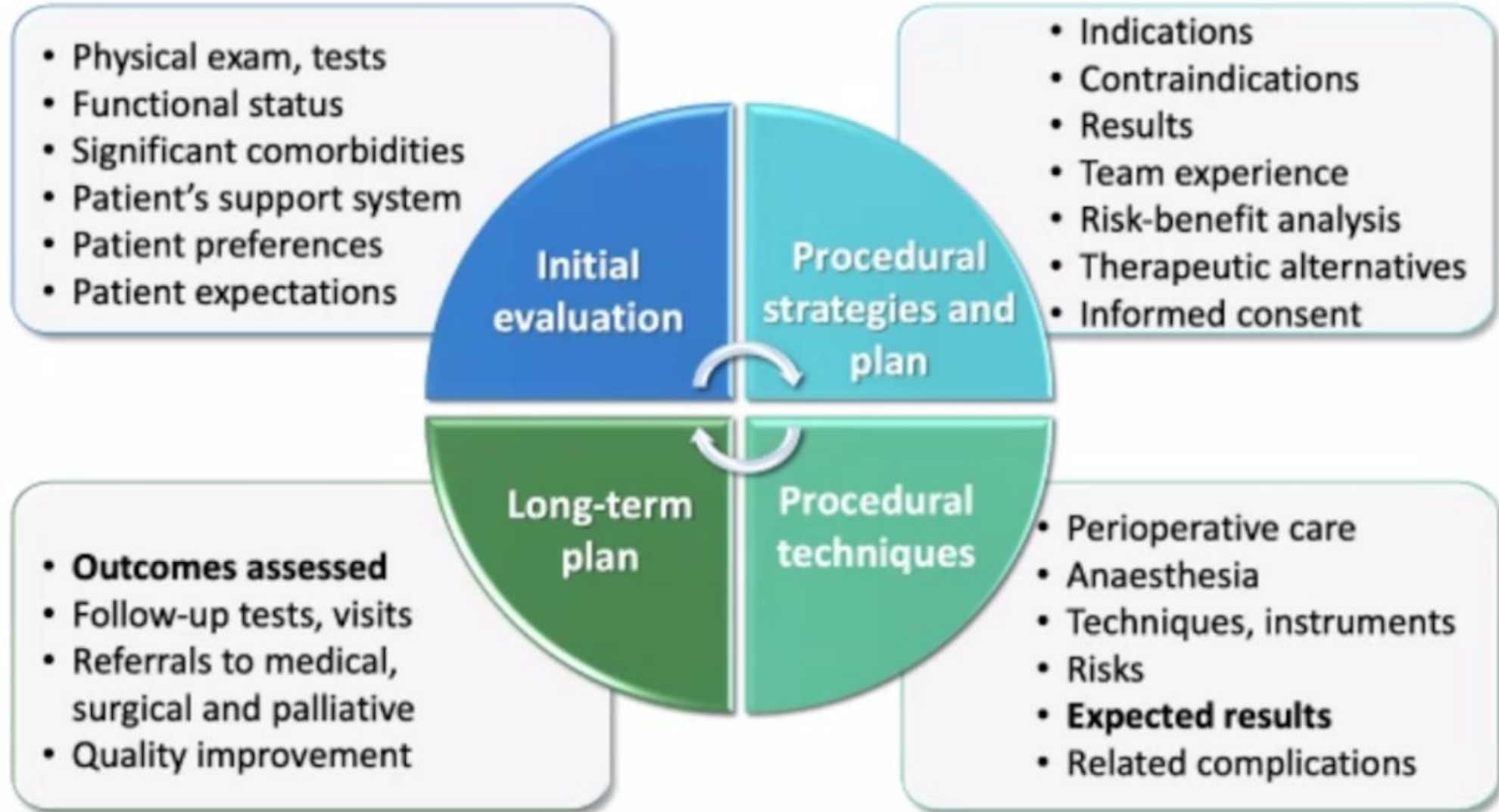
**Table 1.** Summary of the American Society of Anesthesiologists Preoperative Fasting Guidelines for Healthy Patients of All Ages<sup>a</sup>

Ingested Material	Minimum Fasting Period (hr)
Clear liquids <sup>b</sup>	2
Breast milk	4
Infant formula	6
Nonhuman milk <sup>c</sup>	6
Light meal <sup>d</sup>	6
Regular meal	8

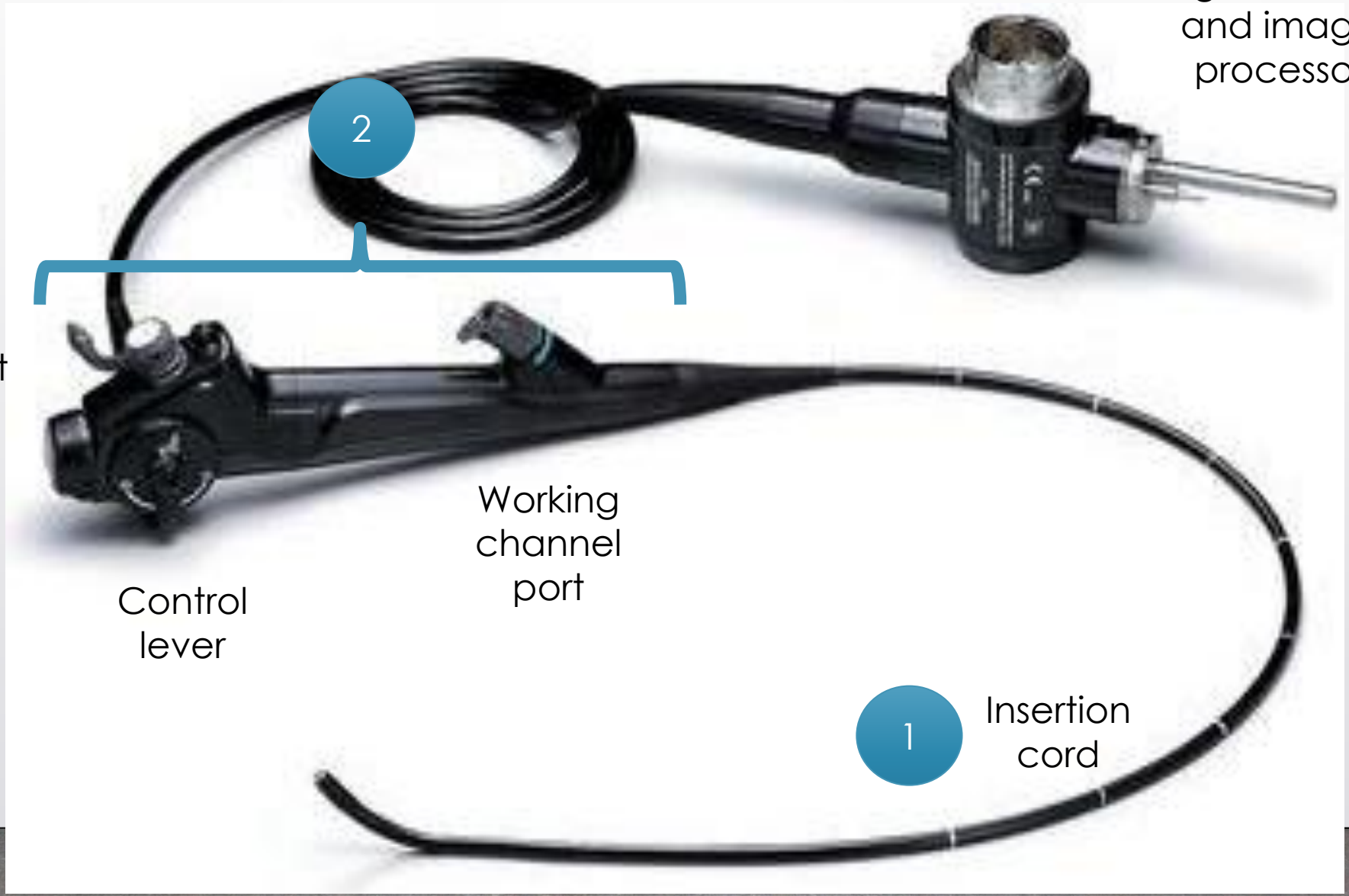
# Bronchoscopy Team



# Systematic 4 box approach



Suction port



Control lever

Working channel port

1 Insertion cord

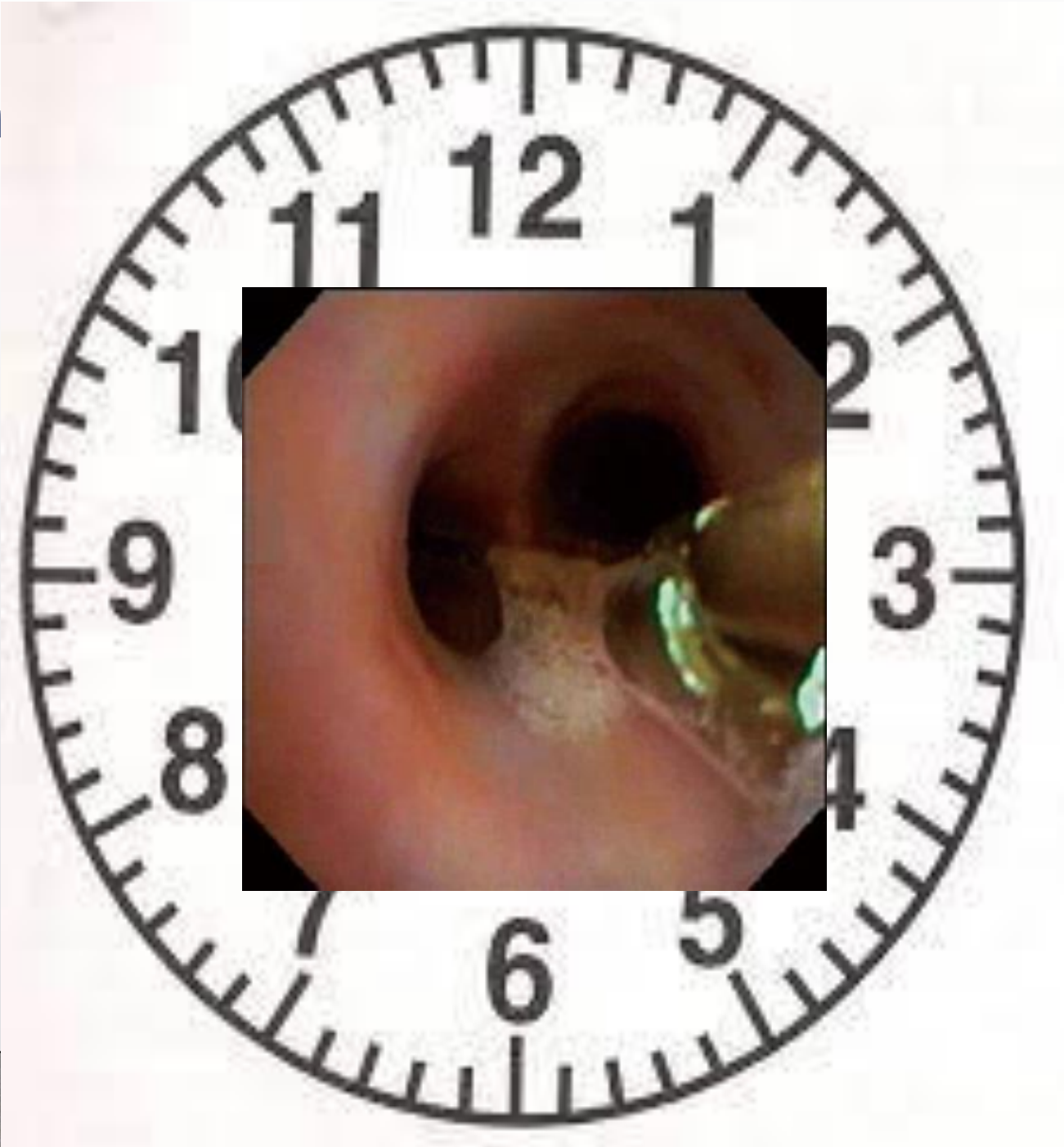
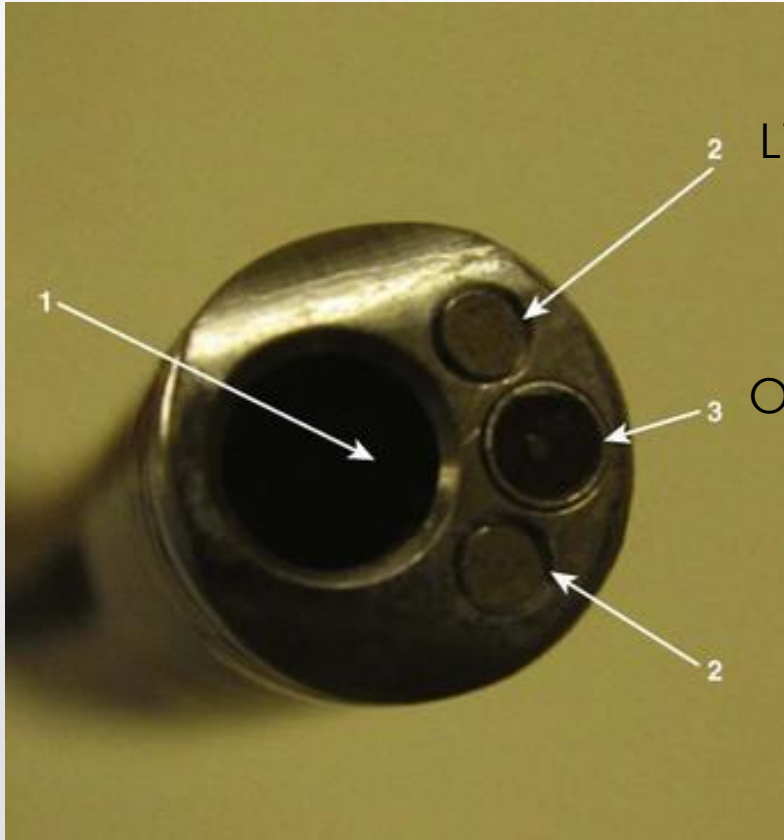
3 Connector to light source and image processor

2

3

1

# 1. Insertion Cord



# 2. Control Body



Control lever



Suction port

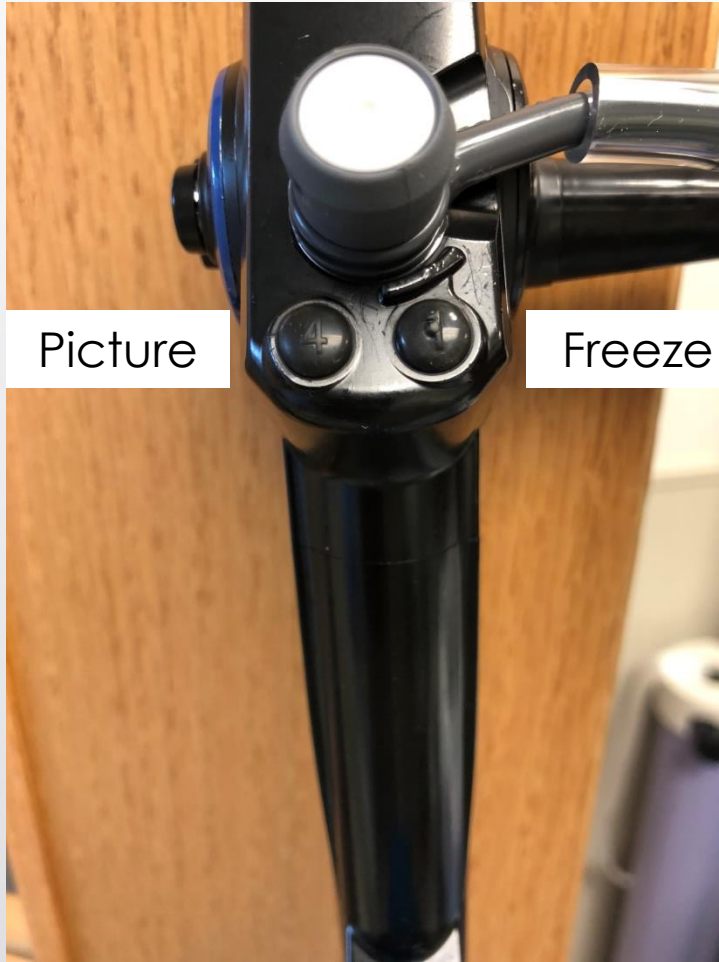
Buttons

Working channel port

## 2. Control Body – Control Lever

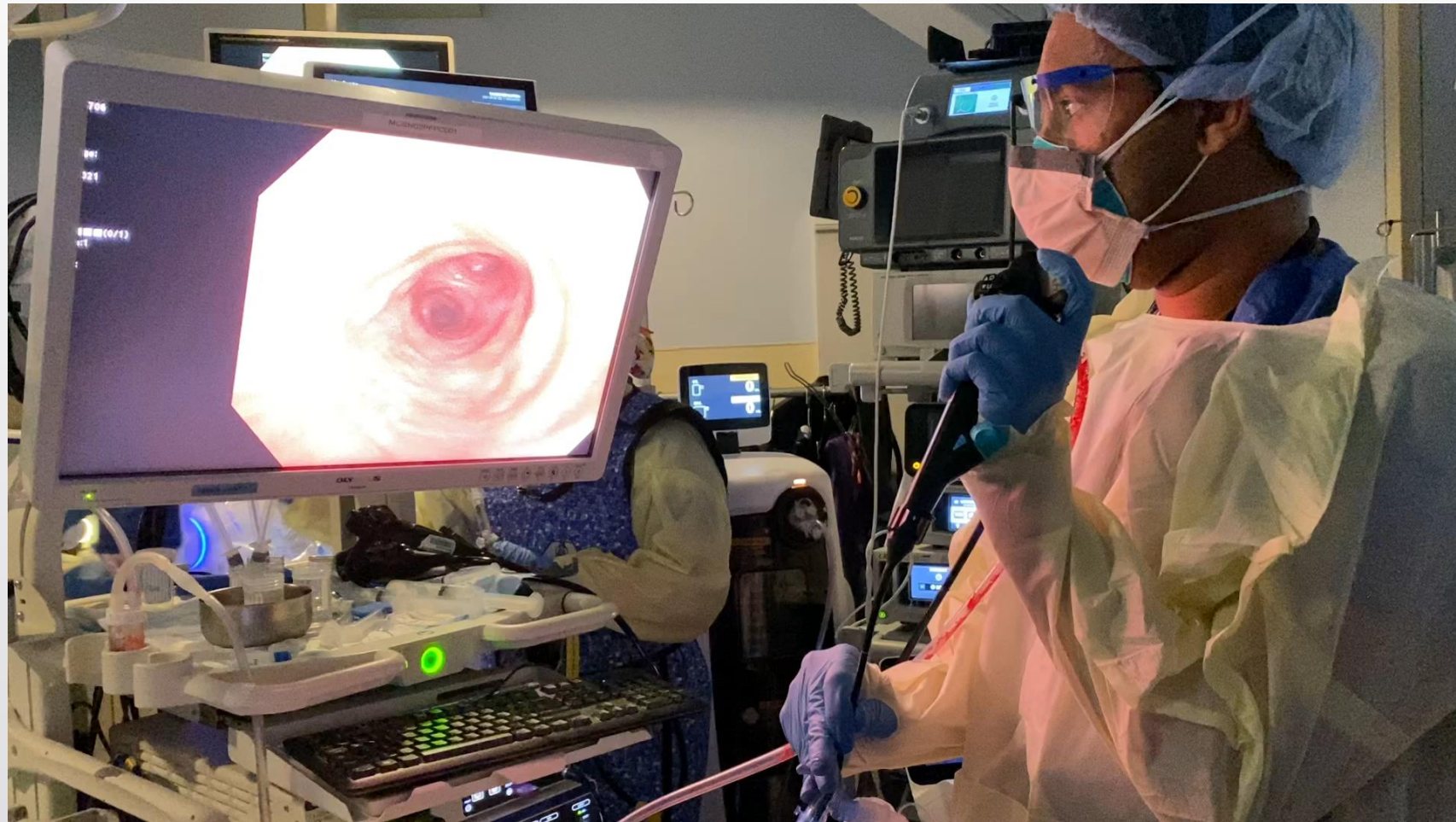


## 2. Control Body – Buttons





# SCOPE DRIVING



# SCOPE DRIVING



# Bronchoscope Selection



Consider:

- 1) Route of entry: mouth, nose, ETT, tracheostomy
- 2) Purpose of the procedure

	Outer Diameter	Working Channel
<b>Olympus</b>		
Hybrid	4.0 mm	2.0 mm
Diagnostic	5.5 mm	2.0 mm
Therapeutic	6.0 mm	2.8 mm
<b>Ambu</b>		
aScope 3 Slim	3.8 mm	1.2 mm
aScope 3 Regular	5.0 mm	2.0 mm
aScope 3 Large	5.8 mm	2.8 mm

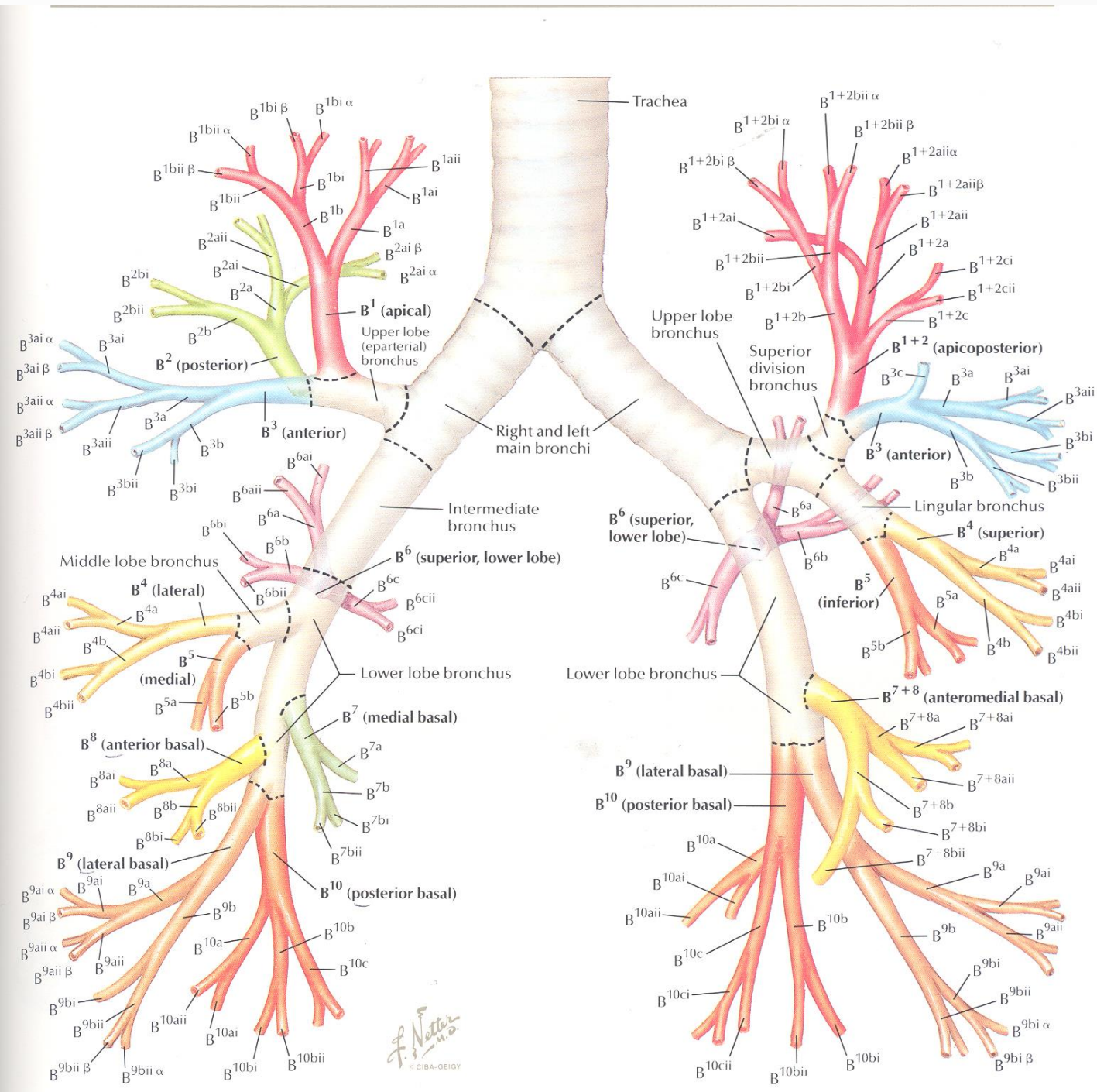


# Samples

- Bronchoalveolar lavage
- Transbronchial needle aspirations
- Brushings
- Biopsies
  - Endobronchial
  - Transbronchial



# Tracheobronchial Anatomy



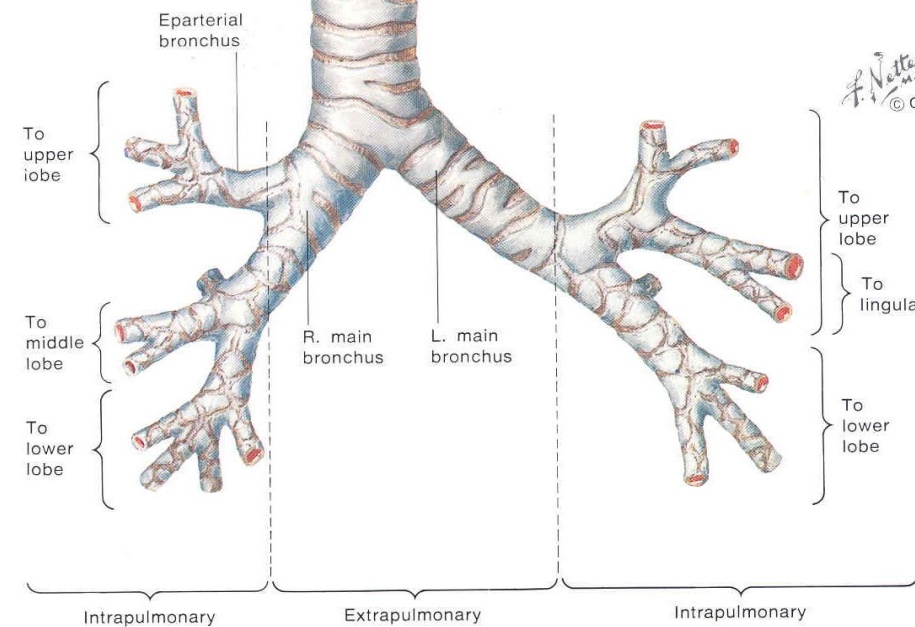
Thyroid cartilage  
Cricothyroid ligament  
Cricoid cartilage

Connective tissue sheath (cut away)

Intercartilaginous ligaments

Tracheal cartilages

Mucosa showing longitudinal folds formed by dense collections of elastic fibers

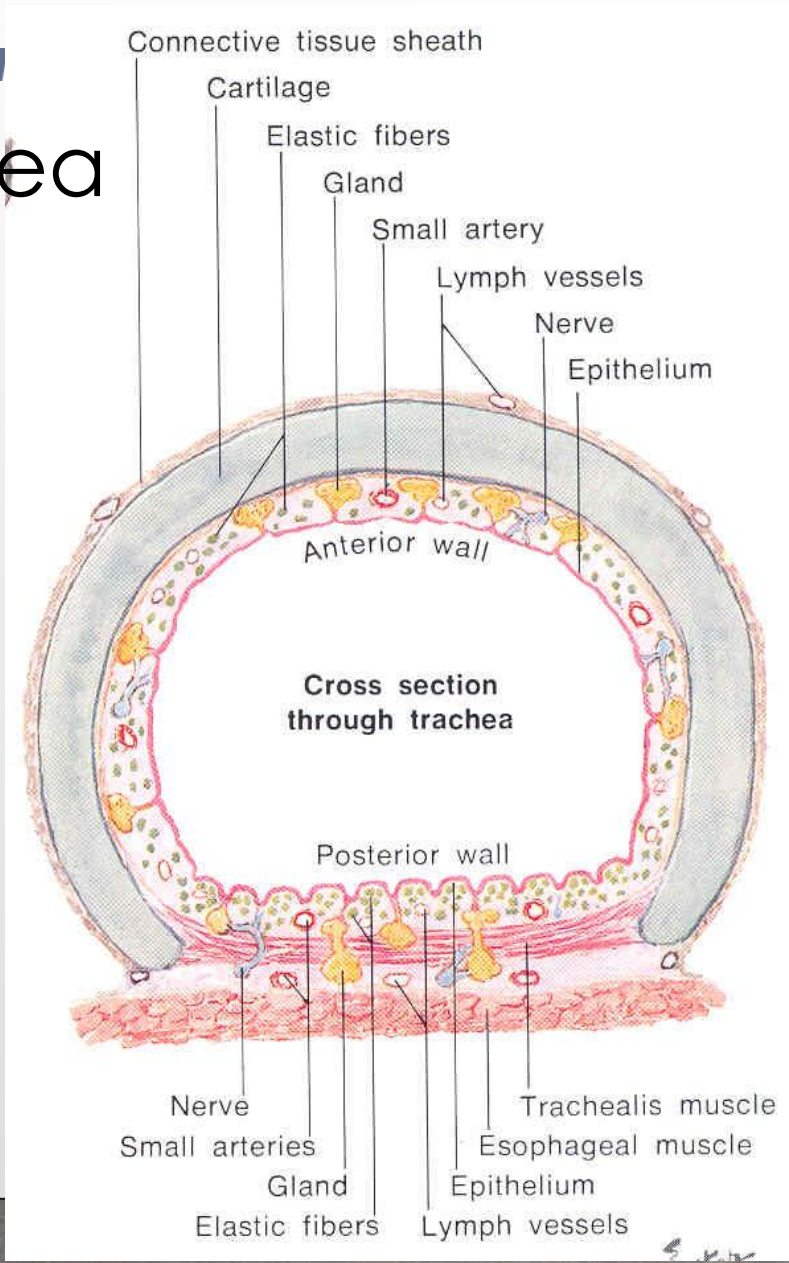


## Trachea

- Diameter varies at different levels and with respiration
- Posterior membrane may move anteriorly with exhalation
- Length 9-15cm in adult, 7-10cm in children
- Distal margin indicated by carina

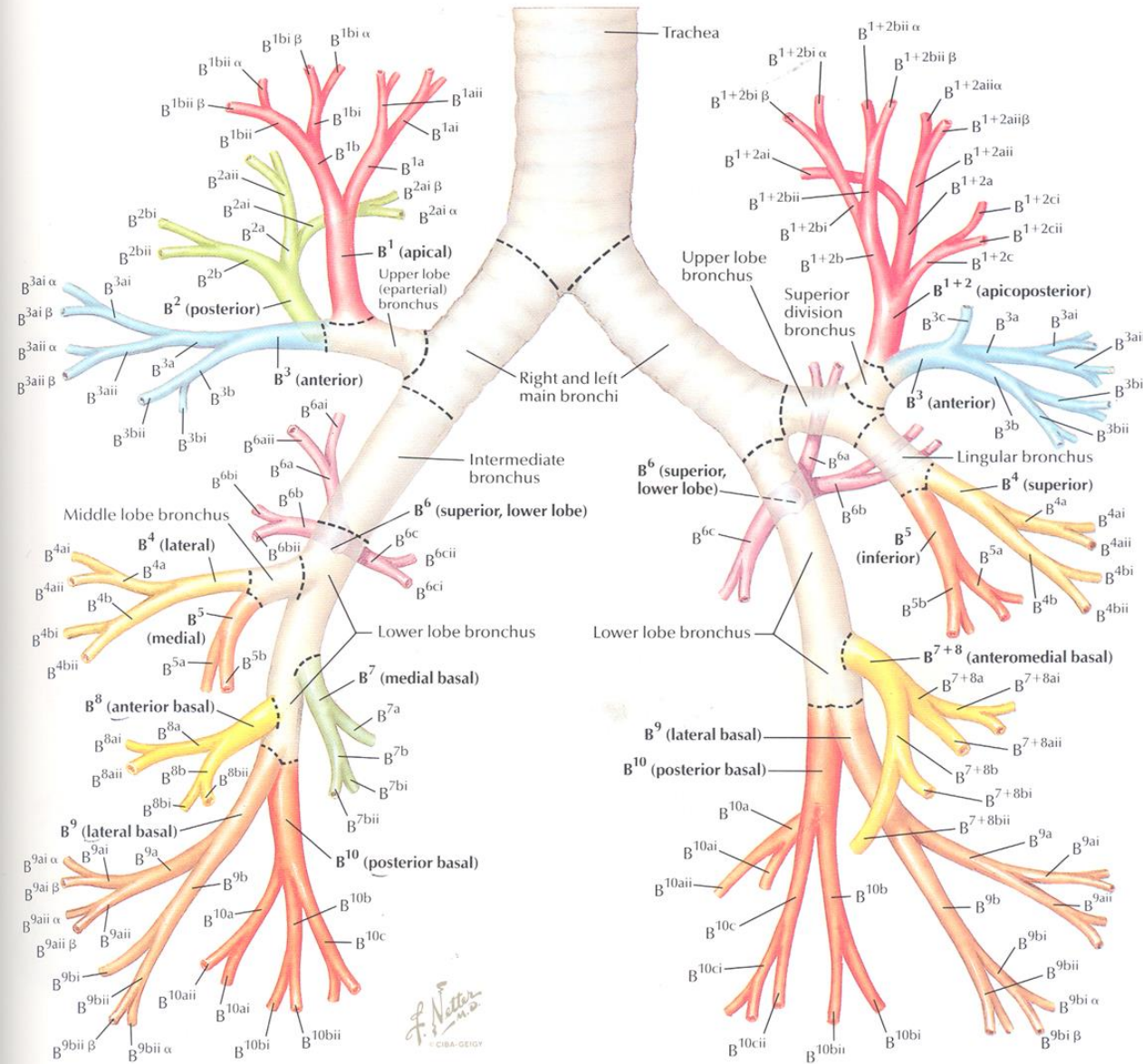


# Trachea



# Bronchial anatomy

- Right lung
  - 3 lobes
  - 10 bronchopulmonary segments
- Left lung
  - 2 lobes
  - 10 bronchopulmonary segments





# Systematic 4 box approach

